SECTION 11852

RUNWAY END IDENTIFIER LIGHTS (REIL)

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SECTION 11852

RUNWAY END IDENTIFIER LIGHTS (REIL)

PART 1 GENERAL

1.1 GENERAL

The contractor shall provide all labor, equipment, and materials as required to install the Runway End Identifier Lighting system (REIL) as specified herein and on the applicable drawings.

The REIL system provides two high-intensity flashing strobe lights positioned at the approach end of a runway to assist a pilot in locating the runway and to mark the runway's threshold. The strobe light can be set to low, medium, or high intensity to compensate for varying visibility conditions.

The system consist of two identifier unit assemblies (flashing lights), and a master control cabinet.

1.2 REFERENCES

TI 6850.103	Instruction Book for Runway End Identifier Lighting (REIL) System, Type FA-19900.

PART 2 PRODUCTS

The REIL system to be installed is type FA-19900 manufactured by DME Corporation.

PART 3 EXECUTION

Install the REIL system per the construction drawings and TI manual.

3.1 INSPECTION

Prior to energizing the REIL, an inspection of the installation shall be made with the FAA Project Engineer present.

3.2 INITIAL STARTUP TEST PROCEDURE

When first activating the REIL, conduct the initial start-up test procedure per the TI manual in the presence of the FAA Project Engineer.

3.3 INSTALLATION VERIFICATION PROCEDURE

After conducting the initial start-up and preliminary testing, verify that the REIL is fully operational by conducting the installation verification procedure per the TI manual in the presence of the FAA Project Engineer.

3.5 STANDARDS AND TOLERANCES

The contractor shall be responsible for the REIL system meeting the standards and tolerances shown on the following pages of this section. Readings and measurements shall be recorded in the space provided and submitted to the FAA Project Engineer.

TECHNICAL REFERENCE DATA RECORD	Location (City/State) Las Vegas, NV	Date Prepared 02/10/10	Page No. 1

Cost Center Code	Location Ident.	Facility Alpha Code	Facility Ident. Code	S	C	F	T	M
WP84PB	LAS	REIL		3	3	1	3	D

Equipment/System Type	Serial No.	Frequency	Optional Use
REIL, FA-19900, DME Corp.	N/A	N/A	

Reference Handbook/Directive (Number and Title/Subject)
Order 6850.5B, Maintenance of Lighted Navigational Aids

Parameter		Standard	Tolerance /Limit	MEASURED
126. LAMP OPERATION		All on	Same as standard	lamps on
127 REMOTE RADIO CONTROL FUNCTIONS		Operational	Same as standard	RMS operational
128. VERTICAL ALIGNMENT				
a. With Baffles		3°	±1°	**N/A**
b. Without Baffles		10°	±1°	degrees
c. OREIL		Lights plumb	Same as standard	**N/A**
129. HORIZONTAL ALIGNMENT.				
a. With Baffles		10°	±1°	**N/A**
b. Without Baffles		15°	±1°	degrees
130. FLASHING RATE				
a. REIL		120 flashes per minute	±2 per minute	flashes/min
b. ODREIL		60 flashes per minute	±1 per minute	**N/A**
131. INPUT VOLTAGE		120V, 240V, or set transformer tap for the applied voltage	±3 percent	
a. INCOMING VOLTAGE TO P/C STATION				V
b. INCOMING VOLTAGE TO ID STA #1				V
c. INCOMING VOLTAGE TO ID STA #2				V

TECHNICAL REFERENCE DATA RECORD		Location (City/State) Las Vegas, NV		Date Prepared 02/10/10		Page No. 2
Cost Center Code WP84PB	Location Ident. LAS	Facility Alpha Code REIL		Facility Ident. Code	S C F T M 3 3 1 3 D	
Equipment/System Type POWER CABLES, 600V AND BELOW		Serial No. N/A	Frequency N/A	Optional Use		
Reference Handbook/Directive (Number and Title/Subject) FAA-C-1217f, 5.3.4						

Reference PAR/DOC Number	Parameters	Conductor	Initial/Auth. Tolerances Lower Limits	Initial/Auth. Tolerances Upper Limits	Measured Values	Revisions Type	Revisions Date	Revisions Initials
	INSULATION RESISTANCE TEST							
	Phase-to-Phase Insulation Resistance		30 MΩ @500Vdc					
	Phase-to-Ground Insulation Resistance		30 MΩ @500Vdc					
	Incoming Power Conductors	L1 (blk)	30 MΩ		MΩ			
	to pwr & ctrl station	L2 (red)	30 MΩ		MΩ			
		N	30 MΩ		MΩ			
	CTRL STA to ID cab. #1	L1	50 MΩ		MΩ			
		L2	50 MΩ		MΩ			
		N	50 MΩ		MΩ			
		LOW	50 MΩ		MΩ			
		MED	50 MΩ		MΩ			
		HIGH	50 MΩ		MΩ			
		TRIG 1	50 MΩ		MΩ			
		MON 1	50 MΩ		MΩ			
		RTN 1	50 MΩ		MΩ			
	CTRL STA to ID cab. #2	L1	50 MΩ		MΩ			
		L2	50 MΩ		MΩ			
		N	50 MΩ		MΩ			
		LOW	50 MΩ		MΩ			
		MED	50 MΩ		MΩ			
		HIGH	50 MΩ		MΩ			
		TRIG 2	50 MΩ		MΩ			
		MON 2	50 MΩ		MΩ			
		RTN 2	50 MΩ		MΩ			

FAA Form 6030-17

TECHNICAL REFERENCE DATA RECORD		Location (City/State) Las Vegas, NV		Date Prepared 02/10/10					Page No. 3
Cost Center Code WP84PB	Location Ident. LAS	Facility Alpha Code REIL		Facility Ident. Code	S 3	C 3	F 1	T 3	M D
Equipment/System Type GROUNDING SYSTEM		Serial No. N/A	Frequency N/A	Optional Use					
Reference Handbook/Directive (Number and Title/Subject) FAA-C-1217f, 4.4.4									

Reference PAR/DOC Number	Parameters	Conductor	Initial/Auth. Tolerances		Measured Values	Revisions		
			Lower Limits	Upper Limits		Type	Date	Initials
EARTH ELECTRODE SYSTEM RESISTANCE								
Resistance to Earth			≤ 10Ω					

DIVISION 16000

ELECTRICAL

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DIVISION 16000

ELECTRICAL

PART 1 GENERAL

1.1 GENERAL

This section covers the requirements for electrical work complete. The work covered under this section consists of furnishing all labor, tools, equipment and material to install the electrical work shown on the drawings and/or described by these specifications.

1.1.1 Workmanship

All electrical installation work shall be performed by experienced electricians regularly engaged in this type of work and properly licensed when required. All materials and equipment shall be installed in conformance with the contract documents, and in accordance with recommendations of the manufacturer as approved by the Resident Engineer.

1.1.2 Interpretation of Drawings

In general, the drawings utilize accepted diagrammatic symbolism to indicate electrical construction work. This symbol does not have any dimensional significance. The layout of wiring, circuits, outlets, and equipment is developed as an engineering aid and should not be interpreted as a release from responsibility for installing the work without space conflict, but all work shall be installed in accordance with the diagrammatic intent of the drawings.

1.1.3 Rules

The installation shall conform to this specification, the contract drawings and to the applicable requirements of the National Electrical Code, local code, or FAA standards. In cases where regulations and/or contract documents are conflicting or discrepancies occur, the more stringent requirement shall be followed and enforced.

1.1.4 Coordination

It is the responsibility of the contractor to totally familiarize himself/herself with the scope of the work involved and to coordinate his work with the other trades and personnel involved with the job site.

1.2 REFERENCES

The issues currently in force of the following specifications and standards form a part of this section, and are applicable as specified herein:

1.2.1 National Fire Protection Association (NFPA) Publications

No. 70 National Electrical Code

No. 78 Lightning Protection Code

1.2.2 FAA Specifications and Standards

UNLESS OTHERWISE INDICATED, THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING FAA SPECIFICATIONS AND STANDARDS:

FAA-C-1217f Electrical Work, Interior

FAA-C-1391b Installation and Splicing of Underground Cables

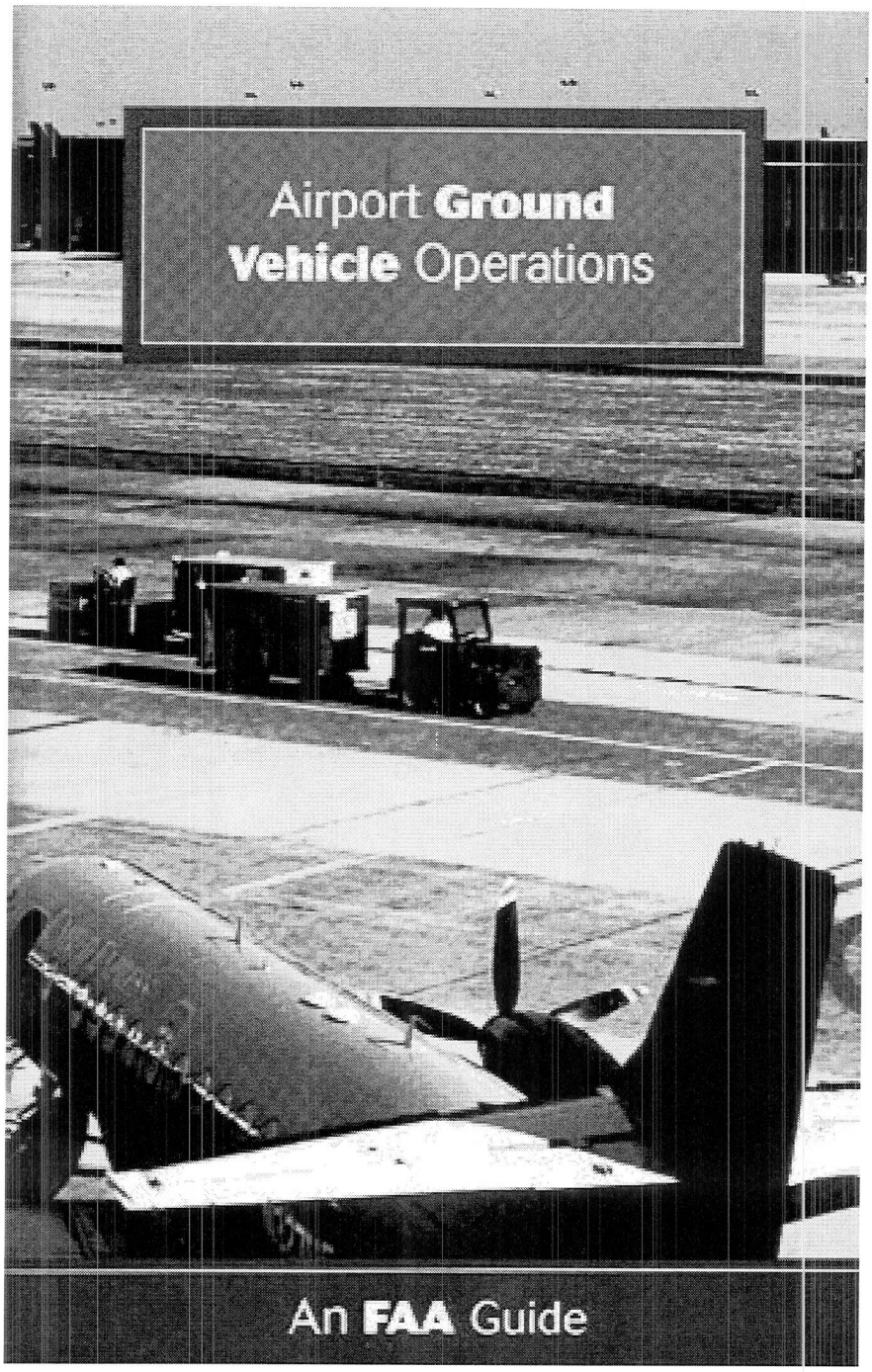
FAA-STD-019e Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

CONTRACTORS SHALL IMMEDIATELY NOTIFY THE FAA OF ANY CONFLICTS THAT EXIST WITHIN THE CONTRACT DOCUMENTS AND BETWEEN THOSE DOCUMENTS AND THE RULES, REGULATIONS AND CODES OF THE LOCAL UTILITY COMPANY AND LOCAL COUNTY OR STATE GOVERNING BODIES. IN CASES WHERE REGULATIONS AND/OR CONTRACT DOCUMENTS ARE CONFLICTING OR DISCREPANCIES OCCUR, THE MORE STRINGENT REQUIREMENT SHALL BE FOLLOWED AND ENFORCED.


Airport Ground
Vehicle Operations
An FAA Guide

- This guide is intended for employees who drive vehicles or motorized equipment on airports.
- **Note to drivers:** Please keep this guide and use it for reference and as a refresher.

This guide provides a general overview of safe procedures for driving on an airport. It is not intended to cover specific conditions at all airports. Some local procedures are unique. If there are questions about differences between this guide and local procedures, they can be resolved by your supervisor or airport manager.

Foreward

Everyone's cooperation is necessary to prevent potentially serious accidents on airports. The FAA has an ongoing program aimed at pilots to help reduce runway incursions, pilot/controller miscommunications and airport surface mishaps. Employees who operate vehicles or equipment on airports also have key responsibilities in these efforts.

By its nature, it is necessary for this guide to be generic. In addition to orientation and operational information, the guide touches on some other areas that a ground vehicle operator may encounter, such as foreign object damage (FOD), security, and reporting emergencies. If this guide is used as a training document at a specific airport, be sure to include that airport diagram along with this guide. Some of the necessary supplemental information is listed below:

- Airport rules and regulations concerning ground vehicle operations.
- Airport diagram showing runways, taxiways, aprons, movement areas, vehicle roadways, location of the airport fire station, critical areas for electronic navigational aids, and areas where vehicles are permitted to operate.
- Airport security procedures that the employee should be aware of and the employees responsibility in this area.
- Procedures, person to contact, and telephone number for reporting emergencies and ground vehicle accidents.

Any comments or suggestions on improving this guide are welcome and should be sent to the following address:

Federal Aviation Administration
Office of System Safety, ASY-300
800 Independence Avenue, SW
Washington, DC 20591

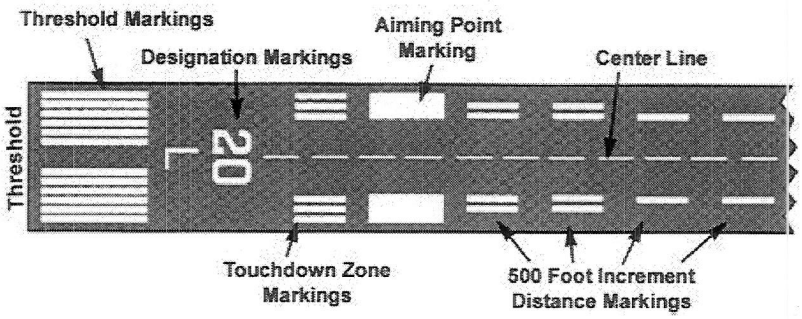
Section One - Airport Basics

The following information explains the basic features of any airport. There may be important unique aspects to the airports on which you drive, such as dedicated vehicle lanes, areas not visible to controllers, or nonstandard traffic patterns. Be aware and know the rules of your airport.

Runways

Runways have specific markings on them that are white. They will have numbers on each end and stripes down the middle with white lines on the edges. Runways that are served by an instrument approach will have more elaborate markings such as those shown in the figure. The most important thing to remember about a runway is that it is meant for aircraft use, so never drive your vehicle on it unless you are authorized to do so.

Runway Markings (not to scale)



Taxiways

Taxiways are areas used by the aircraft to get to and from the ramp and the runway. Taxiways look similar to runways, but are usually not as wide and they don't have the same kind of markings. Taxiway markings are yellow. Instead of numbers, taxiways use letters or letter/number combinations for designators. Like runways, taxiways are meant for aircraft use. Authorization is normally required before you operate a vehicle on runways or taxiways. Aircraft cockpit windows are designed for pilots to see other aircraft. It can be difficult or impossible for the flight crew of large aircraft to see vehicles, particularly behind the wings or under the nose of the aircraft.

Aprons or Ramps

Aprons or ramps are the areas where aircraft park, load, and unload. Your work may require you to drive on an apron. If so, be very careful. Watch out for aircraft that are moving and always yield the right-of-way to them. Don't assume the pilot will see you and stop. He or she may be busy with other things like radio

communications or checklist items.
In addition to watching for moving aircraft, be careful not to get too close to a parked aircraft. Aside from nicks and dents that are expensive to repair, you could be hurt if an aircraft suddenly started its engine and you were too close. You should also be aware of the problem of jet blast or prop wash. There have been several cases where vehicles have been overturned by jet blast. One way to tell if an aircraft is about to start its engine(s) or if the engine(s) is running is that the aircraft's flashing beacons will be on.

Signs

The colors and sizes of signs are important. If the sign has white numbers on a red background, it is a runway holding position sign. These signs are important because they mean you are on the edge of the protected area around a runway and must have permission to proceed.
A yellow sign with black letters is a guidance sign. A black sign with yellow letters is a location sign. The taxiways at your airport may have these signs next to them. Examples are CARGO or TERM to identify what the parking area ahead is used for, or the direction to go to find that area.

Guidance Sign

Location Sign

A driver would see these signs and markings when holding short of runway 18-36 at taxiway "G"

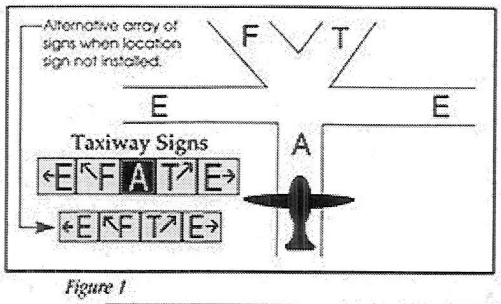


Figure 1

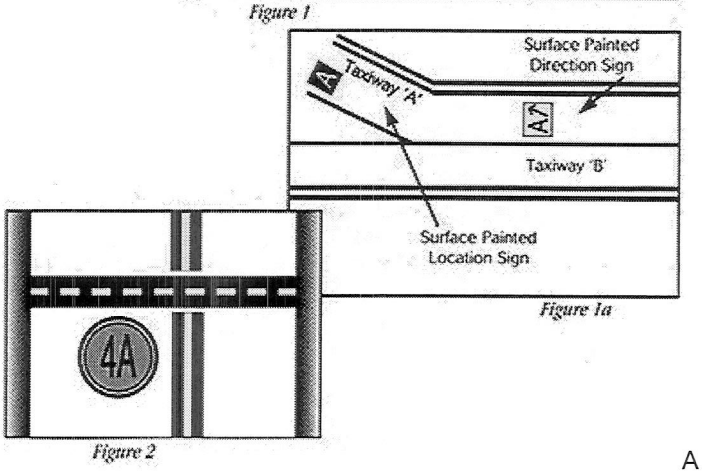


Figure 1a

Figure 2

A taxiway sign with yellow letters and a black background will tell you which taxiway you are on and helps you determine your location. Some airports have these signs painted on the taxiways (see Figure 1 and 1a). Other airports have geographic position markings to use in determining a point on a taxiway (see Figure 2). Not all airports have implemented location signs and geographic position markings.

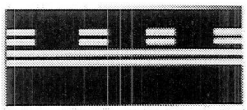
Lights

Runways are edged with white lights and taxiways have blue lights. Near the ends of runways, the lights may be two-sided. Amber on one side, white on the other. At the end of the runway you may also see runway threshold lights. These are red on one side, green on the other. If the amber or red lights are visible you may be approaching the end of the runway. Remember, runway edge lights are white and taxiway edge lights are blue.

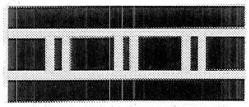
Signage when on taxiway A holding short of runway 16R

Markings

Runway markings are painted white. Taxiways have yellow markings. The center of the taxiway has a solid yellow stripe. The sides may have one or two solid yellow stripes along the edge. Again, not all airports have these markings. As the taxiway comes up to the edge of the runway, you may see what pilots call a "hold"



Hold Line Marking

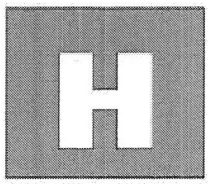


ILS Holding Mark

line that looks like this.

It is two solid yellow stripes followed by two broken yellow stripes. This is the airport version of a stop sign. Along the side of the taxiway next to the holdline, there may be a runway holding position sign (red and white) with the runway number. ILS hold markings advise pilots and vehicle operators where to stop to avoid interfering with aircraft navigational signals. At tower controlled airports, a clearance is required to pass either of these markers and enter the runway. When exiting the runway you may see hold signs with the same marks that appear on the taxiways. Be certain to go beyond these hold markings and signs.

Ramps have markings, as well, for aircraft parking and tie downs. Some airport ramps have special markings for vehicle operations. If there are vehicle or roadway markings, you should always drive your vehicle within those marked areas. Taxiways may also be marked on the apron to show aircraft routes to gates and parking areas.



Helicopter Landing Area Marking

Some airports have designated helicopter landing pads. This is depicted with an H inside of a square. Be especially careful when you drive near helipads and look up for landing helicopters. Like all aircraft, you must yield the right-of-way to a helicopter.

Navigational Aids

When driving near navigational aids, stay out of the protected areas around them to avoid interfering with their signals. If a road or taxiway is close enough to an ILS to affect it, there should be an ILS holding position sign like the one mentioned earlier.

More Signs

There may be signs to remind pilots of noise abatement procedures or warning signs that tell vehicle operators not to proceed beyond a certain point. You may see markings that identify the area of the airport under air traffic control. These markings are yellow and consist of two yellow lines, one solid one dashed. The dashed line faces the area controlled by ATC. Other signs include "distance remaining" signs on the runway to tell the pilot how much runway length is left.

3,000 feet remaining on runway

Section Two - Controlled Airports

If your airport has an air traffic control tower, it is called a "controlled" airport whenever the tower is operating. That means anyone wanting to fly into or out of the airport must first get permission from the controller. Aircraft on the ground and vehicles must also get permission from the controller to be on the runway or taxiways. (Controllers call these areas "movement areas"). As an operator of a vehicle, you must get the controller's permission before you go onto a runway or taxiway, their associated safety areas, or any other part of the movement area. There are at least two ways to get permission, by radio or advanced coordination with ATC. Check the airport diagram and be sure of the location of the movement areas.

Radio Communications Procedures

1. Use an air-to-ground radio with the airport's ground control frequency on it. Each vehicle should have a call sign identifying the vehicle.

2. Know the proper phraseology and never use Citizen's Band (CB) lingo or law enforcement "ten" codes.

3. Think about what you are going to say before calling the controller.

4. Use the proper sequence in calling the controller. Before you start talking, make sure that no one else is already talking. Then you should:
   a) say who you are calling and who you are (e.g., "Cincinnati ground, Vehicle One").
   b) wait for the controller to respond. Sometimes it takes a while if they are busy. When the controller responds, state where you are and where you want to go. For example "Vehicle One is on the terminal ramp and would like to cross 18 Right at taxiway Alpha and proceed to the VOR." Wait for the controller's response.
   c) the controller will either approve or deny your request, or issue special instructions. An example of the instructions would be "Vehicle One, proceed to, hold short of runway 18 Right." Acknowledge that you have heard the controller's instructions. For example "Vehicle One, cleared to VOR, Vehicle One will hold short of 18 Right." Always repeat a "hold short" clearance. The section titled "Aviation Phraseology" lists air traffic control phrases with definitions. You should know what they mean before going onto any runway or taxiway. Note: Use extreme caution when you hear the phrase "go ahead." Controllers use this to mean "state your request." It never means "proceed!"

Communications are not difficult with a little practice. If you are ever unsure what the controller said, or if you don't understand an instruction, ASK THE CONTROLLER TO REPEAT IT WITH "SAY AGAIN." A controller, even one who is extremely busy, would rather repeat and explain something than to have a misunderstanding lead to an accident or runway incursion. Don't proceed thinking that the instructions will become clear once you go a little further.

Advanced Coordination

When you contact the tower, you will receive instructions on how to proceed and what signals to expect.

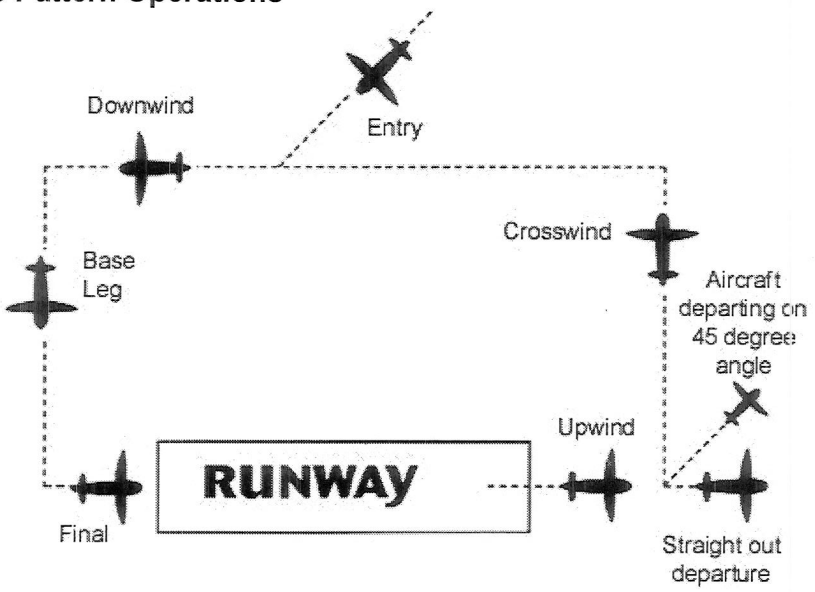
Section Three - Nontowered Aiports

When the tower is closed or if there is no tower, the airport is called nontowered. At a nontowered airport you don't have to get a controller's permission before going onto a runway or taxiway. You should, however, always carry a radio tuned to the airport's common traffic advisory frequency (CTAF) usually called UNICOM. When you get near the runways and taxiways, SLOW DOWN! Look both ways, and then look UP for aircraft that are landing or taking off. Always yield the right-of-way to taxiing aircraft and give them plenty of room. If an aircraft is on the same taxiway as you and headed in the opposite direction, move out of the aircraft's way. Be careful not to hit taxiway edge lights. If an aircraft is about to land on a runway that you need to cross, stop and yield to the aircraft until it has landed and taxied clear of the runway. Then proceed.

Traffic Patterns

Aircraft approaching a runway for landing follow a pattern. In most cases, the pattern is a rectangular box with the pilot making all turns to the left. In a few cases, airports will use right traffic patterns. Pilots announce their position using the names for segments of the traffic pattern (e.g., Woodbridge traffic, Cessna 83 Bravo downwind, approaching base runway 19, Woodbridge). Remember that some aircraft that are not equipped with radios will be operating at nontowered airports, so always visually scan for traffic.

Airport Traffic Pattern Operations



Aircraft at nontowered airports frequently make "touch and go" landings where immediately after landing, full power is applied and the aircraft takes off again. Before you cross a runway, make sure the aircraft has exited the runway or has gone past you.

Extra vigilance is key at nontowered airports. Aircraft do not have to communicate or announce their position in the pattern or on the surface. Some aircraft don't have radios. You can be lulled into complacency at nontowered airports because they usually aren't very busy, hence they don't justify a control tower. If you are used to not seeing any other traffic, don't expect this to always be the case. If your vehicle has a rotating beacon, be sure to turn it on anytime you are on the airport surface.

Sometimes the runway gradient makes it impossible to see the entire length of the runway and an aircraft can suddenly appear when you are crossing. It's best to cross runways at the end.

Section Four - Aviation Phraseology

Acknowledge - Let me know you have received and understand this message.
Advise intentions - Tell me what you plan to do.
Affirmative - Yes.
Confirm - My version is.. is that correct?
Correction - An error has been made in the tranmission and the correct version follows.
Go ahead - State your request (never means "proceed").
Hold - Stop where you are.
Hold short of... - Proceed to, but hold short of a specific point.
Negative - No, or permission not granted, or that is not correct.
Proceed - You are authorized to begin or continue moving.
Read back - Repeat my message back to me.
Roger - I have received all of your last transmission. (It should not be used to answer a yes or no question.)
Say again - Repeat what you just said.
Standby - Wait... I will get back to you. (Standby is not an approval or a denial. The caller should reestablish contact if the delay is lengthy.)
Unable - I can't do it.
Verify - Request confirmation of information.
Wilco - I have received your message, understand it, and will comply.

The Aviation Alphabet

Because some letters sound similar, the following words are used to reduce confusion. For example, taxiway B would be referred to as taxiway Bravo.

A	Alpha	N	November
B	Bravo	O	Oscar
C	Charlie	P	Papa
D	Delta	Q	Quebec
E	Echo	R	Romeo
F	Foxtrot	S	Sierra
G	Golf	T	Tango
H	Hotel	U	Uniform
I	India	V	Victor
J	Juliet	W	Whiskey
K	Kilo	X	X-ray
L	Lima	Y	Yankee
M	Mike	Z	Zulu

Light Signals

Air traffic controllers have a backup system for communicating with pilots if the aircraft's or controller's radios fail. Controllers use a light gun with different colors to tell pilots or vehicle drivers what to do. If you are ever working on a runway or taxiway and your radio quits, you should turn your vehicle towards the tower, start flashing your headlights and the controller will signal you with the light gun.
This may take some time if the controller's attention is directed towards another part of the airport. Alternatively, try another frequency (the tower or "local control" frequency) or telephone the tower if you have access to a phone. BE PATIENT! Even a failed radio is not an excuse for proceeding without a proper clearance.

Light signals and their meanings:

Light signals and their meanings:

Steady green - Okay to cross runway or taxiway; proceed; go.

Steady red - Stop.

Flashing red - Clear the runway or taxiway.

Flashing white - Return to starting point on airport.

Alternating red and green - General warning signal. Use extreme caution. *Note:* The warning signal is not a prohibitive signal and can be followed by any other light signal as circumstances permit.

Section Five - Other Important Information

Foreign Object Damage (FOD)

Trash or rocks sucked into a jet engine can shred parts of the engine in seconds. A rock caught by a propeller can damage the propeller, as well as become a deadly projectile. Make your airport a safer place by putting all trash in a covered container that won't be blown over. Get in the habit of picking up any trash and rocks near aircraft movement areas. Also pick up nails, bolts, or pieces of metal that could cause FOD or puncture tires. Avoid tracking mud and rocks onto the pavement surfaces.

Reporting Accidents

If you are involved in an accident, report it immediately to your supervisor. If a collision occurred between you and an aircraft, it's critical that the aircraft not be flown until the damage can be inspected and repaired.

Aircraft Rescue And Fire Fighting (ARFF)

Just as when you are in highway traffic, if you see an airport emergency vehicle with its lights on, pull out of its way and do not proceed until it is well clear of you.

Security

Depending on the type of airport you work on, the security system may be as simple as a fence or it may include items as complicated as computer controlled automatic gates with television screen monitors. At large air carrier airports, security may be provided by the airport's police department or a contractor. At smaller airports, the airport manager or the fixed base operator may be responsible for security.

If you see a gate left open, close it, and then report it to the airport security office. If you see a strange vehicle on the apron or a vehicle that appears lost, stop it and offer assistance. Or, if your airport has a security department, contact them for help. If you work at an air carrier airport, the airport manager has a complete security plan for the airport. Be sure you know what your responsibilities are and ask your supervisor if there is anything you are unsure about.

Nighttime or Bad Weather Driving

If you have to drive at night, it's a good idea to take someone with you the first couple of times who is familiar with how the airport looks at night. It will look very different. The same applies if you are driving in bad weather. In both cases, allow yourself a little extra travel time and drive slower than you normally would.

Under winter conditions, signs and marking may be obscured by snow. Snow equipment may be operating in low visibility conditions and may not see your vehicle. Use caution, remember there are extra risks present.

Section Six - Quiz

This quiz tests your knowledge of rules, signs, and aviation phraseology. This quiz is not difficult but if you read this guide you should get most of the answers correct. If you don't understand, ask your supervisor for an explanation.

1) A controller who says "go ahead" means:
   a. proceed as requested.
   b. continue straight ahead.
   c. state your message.

2) The red and white sign next to the taxiway is called a runway hold position sign. If you are next to this sign, it means:
   a. that you are about to go onto the protected area next to the runway.
   b. that you should follow the sign to get to the parking apron.
   c. nothing to me, it's only there for the pilot's use.

3) Two solid yellow stripes followed by two broken yellow stripes is the marking for a runway hold line. A hold line means:
   a. all aircraft must stop and be cleared before going onto the runway.
   b. everyone, including vehicles, must stop unless authorized to proceed onto the runway.
   c. that you are about to go next to some electronic signal equipment.

4) Runway markings are:
   a. white.
   b. yellow.
   c. red.

5) Taxiway marking are:
   a. white.
   b. yellow.
   c. red.

6) A "controlled" airport is one that has an operating airport traffic control tower.
   a. True
   b. False

7) FOD is caused by:
   a. bad weather conditions.
   b. the airport manager.
   c. trash and debris.

8) If I have to cross a runway, I should try to do so:
   a. at the end.
   b. in the middle.
   c. wherever I want.

9) If the air traffic controller signals me with a flashing red light, I should:
   a. stop.
   b. clear the runway or taxiway.
   c. ignore the signal as it is for aircraft only.

10) If the air traffic controller signals me with a steady red light, I should:
   a. stop.
   b. clear the runway or taxiway.

c. ignore the signal as it is for aircraft only.

11) Traffic patterns are used at controlled airports (those with towers) only.
a. True
b. False

12) When driving in the area immediately behind a large jet aircraft with its engines running, a driver should:
a. not be concerned about danger from the jet blast because a typical car/van is too heavy to be affected.
b. stop or stay well back and not proceed behind the aircraft until air traffic control has confirmed the aircraft is at idle power.
c. cross the area of jet blast at a perpendicular angle to minimize the hazard.

13) Unless contrary instructions have been received from air traffic control, a vehicle should always yield to an
aircraft.
a. True
b. False

14) If, at a nontowered airport, you see an aircraft approaching the runway to land when you are waiting to cross the same runway, you should:
a. hold short of the runway until the aircraft is past the point at which you will cross the runway then proceed when it is safe.
b. proceed across if the aircraft has not announced its position on the UNICOM frequency.
c. contact the pilot by radio and see if he or she intends to make a touch and go landing.
d. flash your headlights at the aircraft.

15) An aircraft that has announced its position on the UNICOM frequency as "downwind" at the nontowered airport on which you are driving, is flying:
a. perpendicular to the runway after initial climb and turn.
b. parallel to the runway in the direction opposite landing.
c. an approach to land with the wind instead of into the wind.
d. too fast to spot until the aircraft slows down to land.

16) If a controller gives you permission to do something which appears unsafe:
a. you must comply or face disciplinary action.
b. you should comply and then call your supervisor as soon as practicable.
c. you should tell the controller your concerns and get clarification before proceeding.
d. flash your headlights and proceed.

17) Aircraft usually land and takeoff:
a. into the wind.
b. with the wind at their back.

18) An aircraft that has announced its position as "short final" is:
a. nearing the runway threshold for landing.
b. about to make the last landing for the day.
c. well outside of the airport traffic pattern.

19) A touch and go landing involves:
a. a landing without bouncing.
b. a landing followed by immediate application of power to takeoff again without bringing the aircraft to a stop.
c. a lot of skill.
d. aircraft flying in formation.

20) Which of the following will make driving on an airport more difficult?
   a. snow and ice.
   b. night driving.
   c. congested ATC frequencies.
   d. all of the above.

21) An aircraft that has announced its position on the UNICOM frequency as "base leg" at the nontowered airport on which you are driving, is flying:
   a. perpendicular to the runway after initial climb and turn.
   b. parallel to the runway in the direction opposite landing.
   c. perpendicular to the runway about to turn final and land.
   d. with a pilot at the controls whose foot is asleep.

This guide has covered the basics of how to safely drive on an airport. Remember also to be courteous to your fellow drivers, pay attention, don't get distracted, follow the rules and regulations, and set a good example. Eventually you will attain a comfortable working knowledge of how to safely get around. That comes with experience. If there is something you don't understand, always ask before proceeding. As your knowledge and experience grows, share it with new employees or counsel drivers that you see doing something that is questionable or unsafe.

Other sources of information

FAA Videotape

- Runaway Incursions - "The Unseen Danger"

(Video tape and extra copies of this guide available from ASY-300, 202-267-7770)

Publications

Aeronautical Information Manual
(Available from Government Printing Office)

Airport/Facility Directory
Airport diagrams contained in U.S. Terminal Procedures (Instrument Approach Plates)
(The above publications are available from NOAA, 800-638-8972)

Advisory Circular AC 5370.2D - Operational Safety on Airports During Construction
(Available through DOT/FAA, 202-366-2795 Fax Request number)

Pamphlets

- Airport Markings, Signs and Introduction SMGCS, ASY-20, 95/001
- Runway Incursions, FAA/ASY-300 97/002